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Editorial

Crucial role of hand surgery in orthopedic surgery in Japan

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It has been a century since the first class in orthopedic surgery was given in Japan. During that time, techniques for surgery of the hand, which have been mainly for patients with traumatic injuries, have steadily improved and have become an important adjunct to the field of orthopedic surgery. However, hand surgery was not clearly recognized as a specialized field in its own right until comparatively recent years. Traditionally, joint surgery for hip and knee joint disorders and spine surgery for lower back pain and spinal disease held predominant positions, and hand surgery was unfortunately hidden behind them. Although a variety of attempts were made by those specialists to highlight the importance of the peculiarities of the hand (e.g., the existence of sensation and the importance of precise motion for quality of life), their efforts were not sufficiently widespread to form a large base of interest.

Hand surgery was formally introduced to Japan from the United States after World War II, and it has progressed significantly thanks to the extraordinarily dedicated efforts of our forerunners. On July 7, 1957, the first general assembly of the Japanese Society for Surgery of the Hand was held at the Kobe Oriental Hotel, with (then) Professor Tamikazu Amako of Kyushu University as the chairman and (then) Professor Daiji Kashiwagi of Kobe Medical College (present Kobe University) as the facilitator. The 50th annual meeting in May 2007, which was hosted by Professor Toshihiko Ogino of Yamagata University, marked the half-century since the Japanese Society for Surgery of the Hand came into being. The Society has firmly established the position of hand surgery as a subspecialty of orthopedic surgery and has produced a number of outstanding hand surgeons. It currently has more than 3000 members; and more than 400 hand surgery specialists have been certified under its own certification system, which was inaugurated last year.

The science of hand surgery has been marked by bursts of rapid progress interspersed by periods of slow but steady advances. It should be noted that Japanese hand surgeons have made great efforts to achieve such progress, but it must also be mentioned that many hand surgeons overseas have offered valuable aid and have trained a number of Japanese clinicians.

It is commonly accepted, not only by hand surgeons but also by most orthopedists, that the two people who have contributed most to the full-scale introduction of the science of hand surgery and its systematic development in Japan are the late Professor Emeritus Tatsuya Tajima of Niigata University and Professor Emeritus Kenya Tsuge of Hiroshima University, the latter of whom is still actively teaching young surgeons. Professor Tajima devoted considerable energy to training hand surgeons and held a Niigata Hand Surgery Seminar every summer in Niigata. Many doctors currently specializing in hand surgery have attended this seminar, which is still held annually through the efforts of Dr. Takae Yoshizu, Dr. Yutaka Maki, and other members of the Niigata Hand Surgery Foundation. I myself have had the honor of giving lectures on wrist disorders at the seminar for the last few years. Professor Emeritus Tsuge has written two outstanding books: *Principles and Practice of Hand Surgery* and the technical version of the book, *Comprehensive Atlas of Hand Surgery*. Both of these books are considered essential reference works in Japan not only by hand surgeons but also by many clinicians.

It is indeed disappointing to hear some say that hand surgery should remain the domain of only a small group of specialists or plastic surgeons because it is a specialized field. It is a widely known fact that the hand is a body part most susceptible to traumatic and serious injuries because, like the face, its surface is exposed. Patients' disabilities of any part of the body are often

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made worse if there is a mistake in initial treatment, and this is especially true in the case of hand surgery. It is therefore important for all orthopedic surgeons who handle a patient's initial treatment to have knowledge of hand surgery and the hand's anatomy. Although it is important that all orthopedic surgeons have knowledge of hand surgery, I believe that it is more important that there be hand surgery specialists with a general knowledge of orthopedic surgery. In other words, hand surgery specialists trained as orthopedic surgeons are considered to have a wide range of knowledge on all the elements of the limbs — bones, joints, ligaments, nerves, blood vessels, skin — even though the treatment of congenital anomalies and cutaneous scarring is often categorized as falling within the boundaries of plastic surgery. This makes sense considering the fact that one must be a specialist certified by the Japanese Orthopaedic Association to obtain certification as a hand surgery specialist by the Japanese Society for Surgery of the Hand.

Let us take a look at the contribution and future prospects of basic and clinical studies of hand surgery in the field of orthopedic surgery. First, I believe that many of the atraumatic techniques of hand surgery are being adopted into orthopedic surgery in general. A significant contribution in this regard is the reduction of tissue damage. Such surgical techniques are particularly effective when handling the spinal cord, nerves, and blood vessels. Atraumatic techniques in hand surgery are expected to progress further and thus to be reflected more in the results of general orthopedic procedures.

Microsurgery, introduced during the 1960s, was first used to reattach fingers and limbs; more recently it has been applied to tissue transplantation to achieve functional reconstruction. It has now become an essential surgical procedure after massive resection of malignant bone and soft tissue tumors. However, although quite a number of plastic surgeons are acquiring microsurgery techniques in other fields, especially in plastic surgery, I am concerned about the recent shortage of orthopedic surgeons skilled in these techniques. Needless to say, microsurgical skills are essential not only for manipulating blood vessels and nerves under microscopic observation but also for releasing important tissues. My hope is that an increasing number of orthopedic surgeons will acquire these skills.

Although techniques for navigation and robotic surgery are not limited to the field of orthopedic surgery, they have been put into practice for the insertion of pedicle screws and hip and knee replacements; and currently they are being introduced to hand surgery from the field of spine and joint surgery. Although the organs treated during hand surgery are smaller than those in other areas, it is possible that the navigation and robotic surgery techniques developed in this field can be applied to large joints.

Minimally invasive surgery is a recent trend common to surgery in general. It is still important, however, for surgeons to improve their skills and to at least be familiar with conventional skin-incision surgery. There is a tendency to misunderstand that minimally invasive surgery is an operation involving small incision lines on the external surface (skin). If the use of minimally invasive surgery results in an incomplete operative procedure, however, it goes without saying that it is not a satisfactory choice.

The development of arthroscopes was indispensable for minimally invasive surgery. Arthroscopic procedures were first introduced for knee and shoulder joints and then applied to elbow, wrist, and other small joints. Arthroscopes have also been used in surgical instruments for small joints. Arthroscopy has become the gold standard for the diagnosis and treatment of triangular fibrocartilage complex (TFCC) injury and other wrist joint disorders. Advanced procedures that have been used for large joints are expected to progress further through application to small joints and thus to hand surgery in the future.

Regenerative medicine — in which tissue-engineering techniques are used for tissues (bones, cartilage, ligaments, muscles, nerves, blood vessels) constituting the locomotion system — is becoming increasingly popular. Although it is has not yet been applied to all kinds of tissue, it has been used for some of them, and relatively good histological and clinical results have been reported. For regenerative medicine using tissue engineering techniques, the triad of (1) cells (stem cells, Embryonic stem (Es) cells, induced pluripotent stem (iPS) cells), (2) scaffolds (e.g., gel), and (3) signals (e.g., cytokines) is important. Hand surgery is deeply involved in (3), as blood circulation is naturally required. It may be possible in the future to create "Robocop"-type humans by completely replacing body parts under the category "parts surgery."

Thus, hand surgery is expected to progress further in the future and become firmly established in the field of orthopedic surgery.